Extremes of mean temperature for periods of 12 consecutive months at representative Alaskan stations and at Seattle, Wash., and Bismarck, N. Dak.

Stations	Years of record	Normal	Coldest 12-month period			Warmest 12-month period		
			Date	Mean	Departure from normal	Date	Mean	Departure from normal
		°F.		°F.			°F.	
Eagle	17	23.8	July, 1917-June, 1918	18.2	−5.6	October, 1914-September, 1915.	30.2	+6.4
Fairbanks	18	25.5	July, 1917-June, 1918	21.1	−4.4	do	31.0	+5.5
Nome	17	25.2	January, 1920-December, 1920.	21.2	−4.0	January, 1912-December, 1912.	29.5	+4.3
Sitka	24	43.7	October, 1903-September, 1904.	41.3	−2.4	October, 1914-September, 1915.	47.4	+3.7
Fortmann Hatchery.	19	42.8	January, 1909-December, 1909.	38.9	−3.9	January, 1915-December, 1915.	46.6	+3.8
Seattle	32	51.3	January, 1916-December, 1916.	49.2	−2.1	January, 1892-December, 1892.	53.8	+2.5
Bismarck	49	40.5	December, 1874-November, 1875.	35.3	−5.2	December, 1877-November, 1878.	46.3	+5.8

Extremes of precipitation totals for periods of 12 consecutive months at representative Alaskan stations and at Seattle, Wash., and Bismarck, N. Dak.

Stations	Years of record	Normal	Wettest 12-month period			Driest 12-month period		
			Date	Total	Per cent of normal	Date	Total	Per cent of normal
		Ins.		Ins.			Ins.	
Eagle	17	9.87	July, 1910-June, 1911	15.13	153	March, 1920-February, 1921.	6.22	63
Fairbanks.	18	11.88	November, 1906-October, 1907.	23.59	197	April, 1908-March, 1909.	7.28	61
Nome	17	17.37	December, 1921-November, 1922.	31.14	179	September, 1908-August, 1909.	7.33	42
Sitka	24	84.08	February, 1918-January, 1919.	107.58	128	October, 1902-September, 1903.	59.58	71
Fortmann Hatchery.	19	148.06	November, 1905-October, 1906.	188.88	128	June, 1919-May, 1920	107.05	72
Seattle	32	33.43	April, 1893-March, 1894.	48.39	145	December, 1910-November, 1911.	21.01	63
Bismarck	49	16.99	February, 1876-January, 1877.	31.78	187	June, 1889-July, 1890	7.70	45

ON THE APPLICATION OF THE FRONTAL THEORY TO CYCLONES IN THE SAHARA

551.515(661)

By M. L. PETITJEAN

(Comptes Rendus, 179, No. 1, July 7, 1924, pp. 64-65)

[Translated by B. M. Varney, Weather Bureau]

The thermal discontinuity between winds of Mediterranean and of tropical origin in northern Africa reveals the existence, especially in the warmer months, of a special front,[1] which seems to be related to that of the Trade Winds.[2] It delimits the warm and the cold sectors of depressions, the centers of which, at the time of their appearance on the synoptic charts, occupy extreme sourthern Morocco, and the direction of movement of which is confined to either SW.-NE. or W.-E.

The warm sector is at first limited on its western side by the High Atlas of Morocco; it extends toward the north and follows in its course the Saharan chain of the Atlas. On the eastern side its boundary is prolonged as far as southern Tunis. The layer of southerly winds. * * * extends to a higher altitude the greater is the heating in the tropical regions. It rises above the winds from the sea [these constituting the cold sector of the cyclone.—*Ed.*], and its progress northward can be traced from one station by the gradual lowering of its under side, as shown by pilot balloon soundings at military meteorological stations in Algeria and the Sahara.

While maintaining itself in general parallel to the orientation of the Atlas, the front of discontinuity oscillates, with variable amplitude and variable period, as a result of the conflict between the tropical and Mediterranean winds. This is made clear by tracing the lines of synchronous rainfall in connection with the stormy periods which accompany the passage of depressions originating in the Sahara. These lines give way, sometimes toward the north and sometimes toward the south, depending on whether the energy of the tropical winds or that of the winds from the sea is predominant. These alternating advances and retreats are the cause of a succession of very characteristic squalls. When the cold winds finally become dominant they gradually displace the layer of warm winds. Cloudiness decreases continuously and slowly, for the slope of the surface of discontinuity is very slight (a few mm. only), whereupon fine weather succeeds the stormy period.

The topography of north Africa influences the position of the surface of discontinuity as long as that surface passes above the crest of the Atlas Range, the tropical winds rise freely along it. But when, by reason of its shift in position, it is cut by the opposing slope, a foehn effect is produced which gives rise on the opposite side [north side] to a violent sirocco. After having expanded adiabatically during its ascent, the air finds itself after descent at a higher temperature as the result of adiabatic heating due to compression, this heating acting in addition to the gain of heat induced by condensation of water vapor during the ascent.

North of the Atlas the warm air is again forced up, this time above the ocean winds. This double ascent is revealed by the isochrones of rain occurring on the two sides of the mountainous massif.

The warm sector of Saharan depressions usually remains open toward the south side, but it may, as is the case with depressions in the Temperate Zone, be "cut off," either as a result of the arrival of colder air at its rear or of the weakening of the tropical flow. A second depression is thus produced following the first and may in its turn be cut off. It is not rare to discover on the charts of the meteorological service of Algeria cyclone families made up of three of these depressions in a string, lying essentially parallel to the trend of the Atlas.

[1] Petitjean, L., Surfaces de discontinuité en Algerie et au Sahara. (Cahiers du Service Météorologique d'Algerie, 1923, No. 1, p. 13.)

[2] Bjerknes, V., On the dynamics of the circular vortex, with applications to the atmosphere and atmospheric vortex and wave motions. (Geofysiske Publikationer Kristiania, 2, No. 4, 1921, pp. 62-63.)

551.515(262.3)

SECONDARY DEPRESSIONS IN THE ADRIATIC SEA

By FILIPPO EREDIA

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[Translated by B. M. Varney, Weather Bureau]

Sometimes, over the Adriatic appear barometric depressions which, as soon as they are formed, move rapidly in a direction from Northeast to southwest, gradually changing their course by turning toward the south when they reach Sicily or Tripoli. Rarely do they take a course toward the southeast, crossing the Ionian Sea to the Cyrenian Sea. These depressions, believed by most scientists to originate over the Tyrrhenian Sea, present very different characters from those of other depressions in the Mediterranean Basin.